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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,873	03/01/2002	Quinn K. Tong	1987.EEM	7243

7590 07/11/2003

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EXAMINER

ZARNEKE, DAVID A

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 07/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/084,873

**Applicant(s)**

TONG ET AL.

**Examiner**

David A. Zarneke

**Art Unit**

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 33-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other:

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-32, drawn to product, classified in class 257, subclass 787.
- II. Claims 33-39, drawn to method, classified in class 438, subclass 127. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the process as claimed can be used to make other and materially different product. For example, the process could be used to deposit another encapsulant, such as any of the ones described in the prior art cited in the IDS submitted by Applicant.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Charles Almer on 6/25/2003 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-32. Affirmation of this election must be made by applicant in replying to this Office action.

Claims 33-39 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Gilleo et al., US Patent 6,194,788.

Gilleo teaches a B-stage-able underfill encapsulant (7, 54+), wherein the encapsulant solidifies during the B-stage process to produce a smooth, non-tacky surface on a semiconductor wafer (4, 3+) or silicon chip.

The B-stage encapsulant of Gilleo inherently produces a smooth, non-tacky surface because Applicant's own specification states that B-stage means that the underfill must be solidified after its placement on a wafer to provide a smooth, non-tacky coating (page 3, last line and page 4, top).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gilleo et al., US Patent 6,194,788, in view of Kobayashi et al., JP 62-081416A.

Regarding claim 2, Gilleo teaches a B-stageable encapsulant comprising:

- a) thermal curable resin system comprising an admixture of at least one epoxy, one preferably being biphenyl A (4, 7+);
- b) a hardener such as acid anhydrides (4, 12+);
- c) at least one solvent (4, 40+); and
- d) at least one inorganic filler (4, 23+).

Gilleo fails to teach the use of an imidazole in conjunction with the anhydride.

Kobayashi teaches an epoxy composition for sealing a semiconductor comprising a curing promoting agent consisting of (1) a 1,8-diazobicyclo(5,4,0)-7-undecene anhydride (3, last paragraph); and (2) a triphenylphosphine (4, 1<sup>st</sup> paragraph).

It would have been obvious to one of ordinary skill in the art to use the curing promoting agent of Kobayashi in the invention of Gilleo because anhydride-imidazole adducts are conventionally known in the art.

The use of conventional materials to perform their known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

Regarding claim 3, Kobayashi teaches an epoxy and a phenol, wherein the epoxy can comprise an aliphatic epoxy (3, 4<sup>th</sup> to last paragraph).

With respect to claim 4, Kobayashi teaches the epoxy novolak resin (3, 4<sup>th</sup> to last paragraph).

As to claims 5 and 6, Gilleo teaches the use of bisphenol A (4, 7+).

Regarding claims 7-11, it would have been obvious to one of ordinary skill in the art to optimize the percentage of epoxy and phenol in the epoxy/phenol admixture, and the percentage of the admixture in the whole encapsulant (MPEP 2144.05(b)).

With respect to claim 12, Kobayashi teaches the use of a triphenylphosphine and it would have been obvious to one of ordinary skill in the art to optimize the anhydride used (MPEP 2144.05(b)).

As to claim 13, it would have been obvious to one of ordinary skill in the art to optimize the imidazole-anhydride adduct used (MPEP 2144.05(b)).

Regarding claims 14 and 15, it would have been obvious to one of ordinary skill in the art to optimize the percentage of the imidazole-anhydride adduct in the encapsulant (MPEP 2144.05(b)).

With respect to claims 16-18, considering Gilleo teaches the use of solvents or solvent blends that are compatible with the components selected (4, 40+), it would have been obvious to one of ordinary skill in the art to optimize the solvent selected (MPEP 2144.05(b)).

As to claim 19, it would have been obvious to one of ordinary skill in the art to optimize the percentage of solvent in the encapsulant (MPEP 2144.05(b)).

Regarding claims 20 and 21, Gilleo teaches the use of silica filler (8, 12).

With respect to claim 22, it would have been obvious to one of ordinary skill in the art to optimize the percentage of filler in the encapsulant (MPEP 2144.05(b)).

As to claim 23, Gilleo teaches the use of a flux in the encapsulant (4, 18+).

Regarding claims 24 and 25, it would have been obvious to one of ordinary skill in the art to optimize the flux used (MPEP 2144.05(b)).

With respect to claims 26 and 27, it would have been obvious to one of ordinary skill in the art to optimize the percentage of flux in the encapsulant (MPEP 2144.05(b)).

As to claim 28, Gilleo teaches the use of wetting agents, cross-linking agents and polymerization catalysts (4, 18+).

Regarding claims 29 and 30, it would have been obvious to one of ordinary skill in the art to optimize the surfactant and diluent used (MPEP 2144.05(b)).

With respect to claim 31, the B-stage processing of the encapsulant before dicing the wafer into chips is conventionally known in the art.

The use of conventional materials to perform their known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gilleo et al., US Patent 6,104,788, in view of Kobayashi et al., JP 62-081416A.

Gilleo teaches a wafer having B-stageable underfill composition deposited on one face of the wafer, the B-stageable composition comprising:

- a) thermal curable resin system comprising an admixture of at least one epoxy, one preferably being biphenyl A (4, 7+);
- b) a hardener such as acid anhydrides (4, 12+);
- c) at least one solvent (4, 40+); and
- d) at least one inorganic filler (4, 23+).

Gilleo fails to teach the use of an imidazole in conjunction with the anhydride.

Kobayashi teaches an epoxy composition for sealing a semiconductor comprising a curing promoting agent consisting of (1) a 1,8-diazobicyclo(5,4,0)-7-undecene anhydride (3, last paragraph); and (2) a triphenylphosphine (4, 1<sup>st</sup> paragraph).

It would have been obvious to one of ordinary skill in the art to use the curing promoting agent of Kobayashi in the invention of Gilleo because anhydride-imidazole adducts are conventionally known in the art.

The use of conventional materials to perform there known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (703)-305-3926. The examiner can normally be reached on M-F 10AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703)-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-

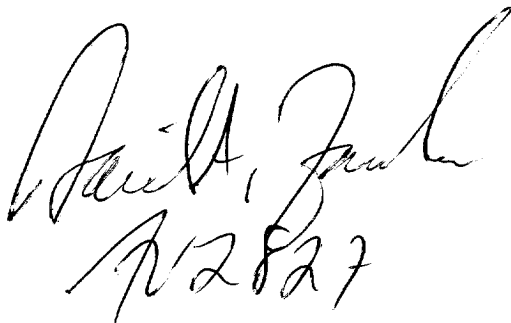


Art Unit: 2827

308-7722 for regular communications and (703)-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

David A. Zarneke  
July 1, 2003

A handwritten signature in cursive script, appearing to read "David A. Zarneke", is written above the handwritten number "2827".